

REMARKS/ARGUMENTS

Claims 1-21 are pending in the application. Reconsideration and a withdrawal of all outstanding rejections is hereby respectfully requested in view of the above amendments and the following remarks.

Applicant has amended the claims to refer to printed circuit boards and foils to more particularly articulate the present invention. New claim 21 has been added to round out the coverage of the claims. The amendments are supported by the specification (see the Abstract, and see p. 12 lines 23-28).

**1. The Rejection Over Rider Should be Withdrawn,
As It Is Improper and Moot.**

Claims 1, 2, 3, 7-9, 11-15 and 19 stand rejected under 35 U.S.C. 102(b) as being anticipated by Rider (5,653,439). This rejection is respectfully but strenuously traversed and reconsideration and a withdrawal of the rejection are hereby respectfully requested.

First, Applicant has amended the claims to recite a method and device for transporting printed circuit boards or foils. Applicant has also amended claim 1 and claim 14 to include the subject matter of claim 5. Accordingly, the rejection is believed to now be moot in view of the amendments.

Second, the rejection is believed to be based on a reference which is not relevant art. Both Rider et al. and Leemhuis et al. (referred to below) are not relevant art to the present invention. Rider et al. relates to the problem of copies exiting a copy

machine tending to jam as the sheets are fed from a copier into stacking trays. The problem arises because the sheets sent to the stacker tray may not have had a chance to settle before the next sheet is ejected into the stacking tray. Another problem is that the sheets are stacked further up in the tray so that when the next sheet is ejected from the copier its leading edge runs into the trailing edge of the sheet already in the stacker. Rider et al. provides an apparatus for corrugating sheets fed from a copier. One of ordinary skill in the art certainly would not have been taught by Rider, nor would Rider have disclosed or suggested, the invention claimed by Applicant, where the force of a debris particle may be handled to prevent impression of the particle into the foil being transported by the rollers.

Likewise, the reference of Leemhuis, for the same reasons, is not relevant art, and does not address the problem to which the Applicant's claimed invention is directed. A reading of what Leemhuis actually discloses makes it clear that it does not offer a solution of how to handle forces from particles, but that following it would only promote the problem. Leemhuis states that "lighter weight material is corrugated, while heavier weight material deflects the flexible shaft(s) to reduce corrugation." (Abstract) Thus the potential for particles to be impressed into the material is not addressed by Leemhuis. Rather, Leemhuis is designed to prevent scrolling of paper in a printing machine.

When the references are viewed for what they fairly disclose, there appears to be no mention or application to the wet processing arts to which Applicant's invention relates. Rider and Leemhuis do not appear to relate to the art of wet processing of foils and their transport in processes, as well as the problem of the undesirable

impressing of particles into the surfaces of foils being transported and processed. The art to which the Applicant's invention pertains is different than the art of the cited references, and the references do not address transport of foils.

**2. The Rejection Over Leemhuis Should be Withdrawn
As It Is Improper and Moot.**

Claims 1-3, 6-9, 11-15, 18 and 19 stand rejected under 35 U.S.C. 102(b) as being anticipated by Leemhuis (6,181,908). This rejection is respectfully but strenuously traversed and reconsideration and a withdrawal of the rejection are hereby respectfully requested.

For the same reasons set forth above, regarding Rider, Applicant believes that the rejection over Leemhuis is also moot. In addition, the Leemhuis reference is not pertinent art (for the reasons advanced above) and would not have been looked to by one of ordinary skill in the art in order to arrive at the Applicant's claimed invention.

Therefore, the rejections with respect to claims 1-3, 6-9, 11-15, 18 and 19, as being unpatentable over Leemhuis, as well as Rider et al., should be withdrawn, as they are not pertinent art, and they are now moot in view of the amendments made to claim 1, and the claims dependent therefrom.

3. Applicant's Invention is Not Obvious Over Rider et al. In View of Hirose.

Claims 4-6, 10, 16-18 and 20 stand rejected as being obvious over Rider et al. in view of Hirose (JP 61075768). This rejection is respectfully but strenuously traversed.

Applicant's invention is distinguishable over the cited art. Applicant has amended claim 1 to more particularly articulate the invention by including the features from claim 5, namely, the claimed bordering elevations encircling the rollers and facing each other:

wherein there is provided at least one bordering elevation (9) at the end of the rollers (1, 2), said bordering elevation annularly encircling the respective one of the rollers (1, 2), and wherein said bordering elevations (9) are disposed on the rollers (1, 2) of a pair of rollers so as to face each other

Claims 2-4, 6-9, 11-13, 15 16, 18 and 19 now also depend from amended claim 1, and therefore include this feature. The bordering elevations at the end of the rollers, annularly encircling the respective one of the rollers, and disposed so as to face each other, is an important feature. As Applicant has pointed out, the problem faced in the art due to processing of thin foils is not addressed by the cited art. The bordering elevations facilitate handling the forces of dirt and debris encountered by the foil during processing (e.g., where the dirt is on a roller).

Applicant notes that the subject matter of the claims, as now amended, is not taught suggested or disclosed by the cited references. Turning to the matter of claim 5 (now recited in claim 1) and claim 17, each recites that there is provided at least one bordering elevation at the end of the rollers said bordering elevation annularly encircling the respective one of the rollers, wherein said bordering elevations are disposed on the rollers of a pair of rollers so as to face each other (see amended claim 1) or, as in claim 17, wherein said at least one bordering elevation (9) at the end of the rollers (1, 2) has a diameter such and is disposed in such a manner that the printed circuit board or foil (4), which has a predetermined thickness, may only be deformed

by particles (10) adhering to the rollers (1, 2) to the extent permitted by the elevations (7).

The references fail to teach the subject matter disclosed and claimed by Applicant in the independent claims 1 and 17, as well as the other pending claims which recite the bordering elevations. Unlike the Applicant's present invention, Rider et al. and Leemhuis et al. merely disclose rollers with staggered elevations. Neither discloses the Applicant's claimed bordering elevations. In Rider and Leemhuis, there are no bordering elevations at the drive shaft, nor at the end of the idler shaft, that is, no elevations annularly encircling the respective one of the shafts disposed on the shafts so as to face each other. In Rider, the roller (40) contains an end plate (46) and a drive pulley (45). In Leemhuis, the shafts (12, 16) are mounted with fixed bearings (14, 18), respectively.

For these reasons, Applicant submits that not only do the references fail to disclose the Applicant's invention because they are not even relevant art, Rider et al. and Leemhuis do not disclose the Applicant's claimed features, nor do they provide a reason or motivation for making the modification as proposed by the Examiner.

Even if however, the proposed modification of Rider with Hirose is attempted, the Applicant's claimed invention would still not be arrived at. Hirose still fails to teach or disclose the Applicant's presently claimed invention, alone or when combined with Rider. The Examiner contends that Hirose would teach bordering elevations at the end of the rollers. In Hirose, the couple (1) of rollers (1a,1b) is provided to have a sorting function by providing a sheet sent out of the copier to a stacker with the capability of moving the sheets to a specified position in the stacker approximately

perpendicular to the direction of sheet transportation. Fig. 4 of Hirose shows that there is provided a plurality of a couple (1) of rollers (1a,1b) which are arranged across the width of sheet travel. A pressurization roller (1a) of couple (1) faces a respective drive roller (1b) such that the sheet is fixed between the respective two rollers and friction is used to transport and to move the sheets safely. Pressure is exerted to the sheet by the upper pressurization roller (1a).

An appreciation of the Applicant's present invention, and the problem that it is directed to solve, demonstrates that Applicant's invention is not obvious over the cited references. Printed circuit foils are very delicate and damageable material. Since very fine circuit lines and other structures are to be formed on the foil surfaces, any dust or other impurities, like abrasive or precipitate solid, must not be permitted to be impressed into the surface of the foil material. Conventional conveyORIZED devices used for treating foils, rollers which face each other are used to convey the foil therebetween. Any dirt deposited on the roller surfaces would then be impressed into the foil by the weight or force of the upper roller when passing this type of roller arrangement. Of course for the foil to be processed without damage, roller debris must be avoided.

Applicant's invention is directed to a new and useful device for transporting flat workpieces, including foils, which prevents the detrimental effect of impressed particles by utilizing rollers having elevations encircling the rollers, and wherein the elevations of one roller are staggered relative to elevations of another roller. Depending on the flexibility of the foil, the foil has the possibility to give way at the location on the foil at which the foil is touched by a heightening or particle adhering to

the heightening to therefore provide for a much lower force to be imparted to the foil surface. Even if dirt particles are touched by one of the elevations, the force exerted by this elevation will not be high enough to impress the particle into the surface of the foil.

The maximum force exerted onto the foil depends on the flexibility of the foil and the interdigitation of the rollers, not on the force of the upper roller. Thus with the Applicant's present invention, the point is not, as in Hirose, to corrugate the foil, but instead to give the foil the ability to give way at the locations where the elevations touch the foil.

Rollers being positioned such that an unacceptable corrugation happens require a predetermined distance being set between the rollers. The bordering elevations recited in claim 1, as amended, and claim 17, limit the minimum distance between the rollers and thus interdigitation. Thus, any dirt present on the surface of the foils cannot be impressed into it by the bordering elevations.

The references relied on by the Examiner do not address or solve the problem of dirt impression into thin foils being transported. The transport device of the Applicant's invention permits foils to be transported, and, in the event dirt and debris may be present on a roller surface, the staggered elevations, and the bordering elevations permit the foils to be transported and handle the forces exerted so that the dirt and debris, if present, is not impressed into the foil.

Hirose does not address the problem of impressing dirt into the surface of sheets being fed between the couple (1) of rollers (1a, 1b). Hirose rather teaches how an efficient sorting of copy sheets may be achieved by transversely moving the sheets

either in the one or the other direction perpendicularly to the transport direction. This latter target is quite different than what has been solved according to the Applicant's present invention. There is no requirement of transversely moving circuit foils in the device of the present invention, and one would consider the Hirose disclosure to relate to a different application.

Considering Rider or Leemhuis, the problem is to present an acceptable interdigitation of the rollers, which Hirose fails to address (keeping in mind also that Rider and Leemhuis relate to corrugation of paper in a copier/printer machine). In accordance with the Applicant's invention, the bordering elevations serve to prevent the foils from being bent too much by preventing the staggered elevations on the rollers from being interdigitated too much. In Hirose, unlike the Applicant's present invention, the rollers (1a, 1b) of the couple (1) of rollers serve to transport copy sheets in the correct or intended manner by squeezing the sheets between the rollers (1a, 1b), and not to limit corrugation. Therefore, when Hirose is considered for what it fairly discloses, it is clear that one of ordinary skill in the art would not have looked to Hirose to solve the problem which the Applicant's present invention relates.

In addition, not only would one of ordinary skill in the art not have looked to Hirose, but even if Hirose was consulted, it does not provide a teaching, suggestion or disclosure of the Applicant's invention or solution to the problem which the present invention addresses. In order to have the copy sheets be transported safely, Hirose exerts a certain additional pressure to the copy sheets. However, if Hirose were applied in order to attempt to derive the Applicant's invention, the results would not be workable. Even if Hirose were combined with Rider (as the Examiner proposes in the

Office Action) the pressure exerted by the rollers (1a,1b) on the article being transported would be extremely detrimental to the quality of the circuit foils to be manufactured. As discussed above, any dirt on the rollers eventually is likely to be impressed in the surface of the foils being transported and processed. Since Hirose would therefore provide the consequence of dirt being impressed into the surface with the apparatus it discloses, one of ordinary skill in the art would not have looked to Hirose to solve the problem addressed by the Applicant's present invention.

Moreover, Hirose actually teaches away from the Applicant's present invention. First, contrary to the Applicant's present invention, Hirose does not provide the facing elevations only at one end of the rollers ("bordering elevations") but predominantly also between the ends thereof. If this technique and arrangement were to be used, the problems to be solved would not be prevented, but would remain. Thus, this is another reason one of ordinary skill in the art would not have looked to Hirose to derive the Applicant's invention. Second, if Hirose were to be applied, then due to the different rates on rolling of the rollers having different diameters (which is what Hirose discloses), abrasive traces would be created on the foil. Therefore, this is yet another reason why one of ordinary skill would not have been led by Hirose to arrive at the Applicant's present invention.

For the above reasons, Applicant's invention is not obvious in view of the cited references and should be patentable.

Claim 8 is not obvious for the same reasons set forth above, as well as for additional reasons. Claim 8 includes the feature that the rollers are provided with the height of the elevations (7) ranging from 0.1 mm to 10 mm, which additionally seal

the interior of the processing line from the outside, to minimize or prevent fluid flow from the interior of a processor if used at an entrance or exit of the processor. (See the Applicant's Specification, published as WO 03/069965, page 9, line 28 through p. 10, line 4.) Applicant submits that the cited references fail to teach, suggest or disclose this novel feature of the Applicant's invention.

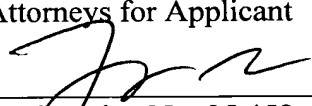
For the reasons set forth above, applicant hereby respectfully requests reconsideration and withdrawal of all outstanding rejections. Early allowance of the claims is earnestly solicited.

CONCLUSION

As set forth above, it can be appreciated that the Applicant's inventive solution, as disclosed and claimed, is novel and unobvious, and solves a problem which the prior art references do not address. Applicant's invention is believed to be patentable in that the pending claims overcome the rejections set forth by the Examiner. If further matters remain in connection with this case, the Examiner is invited to telephone the Applicant's undersigned representative to resolve them.

If an extension of time is required, one is hereby requested.

Respectfully submitted,
Frank J. Bonini, Jr.
HARDING, EARLEY, FOLLMER & FRAILEY
Attorneys for Applicant


Registration No. 35,452
P. O. Box 750
Valley Forge, PA 19482-0750
Telephone: 610-935-2300

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